

## TENTATIVE SYLLABUS

**Biology 627 / EVSS 627**

**Marine Tetrapod Biology**

**Fall 2017**

Lecture 202 Grice 4hrs credit total with co-requisite 627L (lab/field component)

**Instructor:** Andy Shedlock  
**Office:** Hollings Marine Lab - Room H212-C  
**Hours:** HML Fridays 11-1PM (or by appointment)  
**Phone:** Office: 843-725-4874; Cell: 843-469-0393  
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**Dropbox:** Shared folder "Tetrapods F17"

**Meeting Times** 2 pm - 5 pm Grice Lecture Room 202, Monday and Tuesday  
THIS WILL NEED TO BE FLEXIBLE FOR FIELD TRIPS

### Texts

Spotila, Jim, 2004. Sea Turtles: a Complete Guide to their Biology, Behavior and Conservation. Johns Hopkins University Press ISBN 0-8018-8007-6; Required

Berta, Sumich and Kovacs, 2006. Marine Mammals: Evolutionary Biology 3<sup>rd</sup> Edition Academic Press, Second Edition ISBN 100120885522; Required

Fitzpatrick: Field Guide to the Birds of North America  
National Geographic Society Edition ISBN 0792268776  
Suggested volume but can use similar field guide such as Peterson's or Sibley's

### Supplemental References On reserve in the Marine Resources Library (MRRRI Bldg)

Bolton, Alan, and Blair Witherington. 2003. Loggerhead Sea Turtles. Smithsonian Books, Washington 319 pp. ISBN 1-58834-136-4

Callaway, J. M. and E. L. Nicholls. 1997. Ancient Marine Reptiles. Academic Press. 501pp. ISBN 0-12-155210-1.

Carr, Archie. 1967. So Excellent a Fishes. The Natural History Press. 258pp.

Heatwole, Harold. 1999. Sea Snakes (Second Edition). University of New South Wales Press and Krieger Publishing. 148pp. ISBN1-57524-116-1.

Lutz, P., J. Musick. 1997. The Biology of Sea Turtles, Volume I, CRC Press. 432pp. ISBN 0-8493-8422-2.

Lutz, P., J. Musick, J. Wyneken. 2002. The Biology of Sea Turtles, Volume II, CRC Press. 496pp. ISBN 0-8493-1123-3.

Schreiber, E.A. and J. Burger. 2002. Biology of Marine Birds. CRC Press. 722 pp. ISBN 0-8493-9882-7.

Wyneken, J., K. J. Lohman, J. Musick. 2013. The Biology of Sea Turtles, Volume III, CRC Press. 457pp. ISBN 978-1439873076.

## Grading

The course grade will be based on: (1) a written term paper; (2) two-part oral presentation on the term paper topic; (3) two lecture exams; (4) a field/lab notebook; and (5) active class participation. Each item (1-5) is worth 20% of the grade.

- A 90 above
- B+ 86-89
- B 80-85
- C+ 76-79
- C 70-75
- F below 70

## Synopsis

Over the past 200 million years vertebrates have repeatedly evolved adaptations that take advantage of the extensive estuarine and marine habitats of our planet. This course emphasizes the comparative evolutionary perspective and historical processes that have led to both the diversity and the common themes of physiological, behavioral and anatomical adaptations which characterize amniote lineages of reptiles, birds and mammals that exploit a wide array of marine situations. The adaptations of turtles, crocodiles, snakes, the iguana, birds, pinnipeds, sirenians, polar bears, otters, and cetaceans will be addressed in lectures, discussions, labs and field work. Special attention will be given to the faunas of South Carolina. In this course we will review the research and natural history literature regarding marine tetrapods and place this literature in the context of current research priorities and needs for understanding the basic biology and conservation of these species. We will evaluate marine tetrapods as models for advanced studies in evolution, physiology, behavior and ecology. Each student will also review the literature in an area of higher marine vertebrate biology and develop a term paper and seminar on this topic. Lab and field work will be integrated each week with the lecture and will emphasize hands-on techniques, conservation and behavioral physiology.

Since several Charleston area faculty work on marine tetrapod questions, we will take advantage of their expertise as guest lecturers and lab/field trip hosts during the semester. ***We must maintain a flexible laboratory schedule and flexible attitude*** since we need to take advantage of the many opportunities as they happen. For example, if a marine mammal strands, we need to be able to adjust our schedules to assist with the necropsy under the direction of adjunct faculty member Wayne McFee at the NOS laboratory. Thus this laboratory may occur at any time during the semester, depending on availability of specimens. Likewise, weather may preclude going into the field on a Tuesday but we might be able to adjust for this by switching the trip to a Monday.

## **Learning Objectives**

1. To develop a solid working knowledge of the biological diversity of the marine reptiles, birds and mammals.
2. To thoroughly understand the evolutionary significance of secondary marine adaptations.
3. To evaluate the evolutionary relationships of the extinct and living marine tetrapods.
4. To learn the basics of marine tetrapod physiology, ecology, behavior, anatomy and field identification.
5. To learn the primary laboratory and field techniques for the study of marine tetrapods.
6. To appreciate the wide diversity of conservation issues related to marine tetrapods.

## **Preliminary Schedule & Syllabus (tentative, based on need for flexibility)**

Standard 2.5 hour lecture format will be: 1-hour lecture, short briefing about weekly field trip/lab logistics, 15-minute break, video presentations or primary literature and group discussion, especially regarding conservation issues.

Text Abbreviations: MME (Berta et al., Marine Mammal Evolution); MB (Schreiber and Burger, Marine Birds); ST (Spotilla, Sea Turtles); SS (Heatwole, Sea Snakes)

### **WEEK 1 AUG 22**

Introduction to the class, discussion of syllabus, review of field trip schedule for the entire semester; South Island Field Trip Logistics

Video: Incredible Journey

Reference: MME Ch. 2

### **WEEK 2 AUG 28-29**

What do we mean by “Marine” + “Tetrapods”?

Video: Morphed

Reference: MB Ch. 6

Field/Lab: DNR Sea Turtle Nest Inventory, Yawkey Wildlife Refuge

### **WEEK 3 SEPT 4-5**

Stem tetrapod diversity and adaptations

Discuss synoptic reference handouts of vertebrate evolution and systems

Reference: ST Ch. 1-4

Video: Kiawah turtle research in the 1970's

Field/Lab: SC Aquarium, Sea Turtle Rescue Center

### **WEEK 4 SEPT 11-12**

Guest Lecture, Prof Dave Owens: 35 Years of Sea Turtle Research

Reference: ST Ch. 5, 10, plus Conclusion (13)

Video: vintage excerpts from the Owens archive

Field/Lab: DNR Sea Turtle Necropsy, HML

STUDY FOR EXAM 1

**WEEK 5 SEPT 18-19**

**MIDTERM EXAM** (1 hour) + Break

Introduction to birds

Reference: MB Ch. 1, 3, 18, 19 over successive weeks

Video: Life of Birds

Field/Lab: Turtle Survival Alliance Conservation Center

**WEEK 6 SEPT 25-26**

Field/Lab: TWO DAYS Bennett's Point/Donnelly ACE Basin

Monday overnight stay at DNR McKenzie Field Station

ACE conservation management and coastal habitat surveys

**WEEK 7 OCT 2-3**

Guest Lecture, Dr. Melissa Chaplin, Endangered Species Biologist, USF&W

Avian conservation and shorebird ecology

Field/Lab: M. Chaplin USF&W tour of Bulls Island Wildlife Sanctuary

**WEEK 8 OCT 9-10**

**Oral Presentations: Summary and Intro of Term Papers**

Tetrapod diversity and the paraphyly of convergent marine forms

Reference (a): MME Ch. 1, 3 and 5, over successive weeks (sirenians before FL)

Reference (b): ST Chap 9 and A. Carr: *So Wonderful a Fish* (before FL)

Video: Galapagos

Field/Lab: The Center for Birds of Prey

**WEEK 9 OCT 16-17**

**Fall Break No Class**

**WEEK 10 OCT 23-24**

**FLORIDA ROAD TRIP**

**DEPART SATURDAY 22<sup>nd</sup> 6 a.m. – RETURN TUESDAY 24<sup>th</sup> ~9 p.m.**

Archie Carr NWR / Melbourne Beach UCF Field Station 1 night

Mote Marine Lab Research Center and Aquarium

Myakka River State Park camping 2 nights

**WEEK 11 OCT 30-31**

Mace Brown: Cetacean origins and the Mace Brown Museum of Natural History

Prof. Phil Manning: The golden age of marine reptiles; paleo research at CofC

Dr. Bobby Boessenecker: Pinniped origins, diversity, and life history

Reference: MME Ch. 4, 10, 11, 12 over successive weeks

**Week 12 NOV 6-7**

Curator Matthew Gibson: Charleston Museum Natural History Collections

Wayne McFee, NOAA-CCEHBR: Atlantic odontocete population research and marine mammal stranding network operations in South Carolina

**WEEK 13 NOV 13-14**

Special topics in marine mammal biology and conservation

Video: Kingdom of the Blue Whale

Reference: MME Ch. 14.3.3 p.544-556, Ch 15

Field/Lab: Dolphin behavior and bird spotting, Rat Island

**WEEK 14 NOV 20-21**

Marine tetrapod genetics and genomics

Video: Blue Planet Coastal Seas

Reading: MME Ch. 14.3.3 p.544-556, Ch 15

**ORAL PRESENTATIONS OF TERM PAPERS**

STUDY FOR EXAM 2

**Week 15 NOV 27-28**

Addlestone Library Special Collections

Review of Exam 2 materials

Video: Frozen Planet

**EXAM 2 (PART 2 MATERIALS ONLY)**

**Week 16 DEC 4**

Summary and prospectus for future research

Class "Open Discussion" FB Pier

**Term Paper Due**

**Field/Lab Notes Due**